

Claims as originally filed:

- 1 1. (Original) An integrated circuit processor comprising:
  - 2 a first instruction buffer corresponding to a primary thread;
  - 3 a second instruction buffer corresponding to a backup thread;
  - 4 a thread switch mechanism that detects when the primary thread stalls, and in
  - 5 response thereto, swaps information stored in the first instruction buffer with information
  - 6 stored in the second instruction buffer.
- 1 2. (Original) The integrated circuit processor of claim 1 wherein execution of the  
2 backup thread occurs after the swap by executing at least one instruction in the  
3 first instruction buffer.
- 1 3. (Original) The integrated circuit processor of claim 1 further comprising:
  - 2 a third instruction buffer corresponding to a second primary thread;
  - 3 a fourth instruction buffer corresponding to a second backup thread;
  - 4 wherein the thread swap mechanism further detects when the second primary
  - 5 thread stalls, and in response thereto, swaps information stored in the third instruction
  - 6 buffer with information stored in the fourth instruction buffer.
- 1 4. (Original) The integrated circuit processor of claim 3 wherein the first and second  
2 primary threads simultaneously issue instructions for execution.

1 5. (Original) An integrated circuit processor comprising:  
2 a first primary instruction buffer corresponding to a first primary thread;  
3 a second primary instruction buffer corresponding to a second primary thread;  
4 wherein the first and second primary threads simultaneously issue instructions for  
5 execution;  
6 a first backup instruction buffer;  
7 a second backup instruction buffer;  
8 a thread switch mechanism that detects when one of the first and second threads  
9 stalls, and in response thereto, swaps information stored in one of the first and second  
10 primary instruction buffers corresponding to the stalled thread with information stored in  
11 one of the first and second backup instruction buffers.

1 6. (Original) The integrated circuit processor of claim 5 wherein the thread switch  
2 mechanism:  
3 (1) detects when the first primary thread stalls, and in response thereto,  
4 swaps the first primary instruction buffer with the first backup instruction buffer;  
5 and  
6 (2) detects when the second thread stalls, and in response thereto, swaps  
7 the second primary instruction buffer with the second backup instruction buffer.

1 7. (Original) The integrated circuit processor of claim 5 wherein the first and second  
2 backup instruction buffers are part of a pool of backup instruction buffers,  
3 wherein information in any backup instruction buffer in the pool may be swapped  
4 with information in the first primary instruction buffer, and wherein information  
5 in any backup instruction buffer in the pool may be swapped with information in  
6 the second primary instruction buffer.

1       8.     (Original) An integrated circuit processor comprising:  
2            a first primary instruction buffer corresponding to a first primary thread;  
3            a second primary instruction buffer corresponding to a second primary thread;  
4            wherein the first and second primary threads simultaneously issue instructions for  
5            execution;  
6            a first backup instruction buffer;  
7            a second backup instruction buffer;  
8            a thread switch mechanism that detects when the first thread stalls, and in  
9            response thereto, begins issuing from the first backup instruction buffer, and that detects  
10          when the second thread stalls, and in response thereto, begins issuing from the second  
11          backup instruction buffer.

1 9. (Original) A method for switching between a first thread of execution and a  
2 second thread of execution in a multithreaded processor, the method comprising  
3 the steps of:

4 (A) providing a first instruction buffer corresponding to the first thread;  
5 (B) providing a second instruction buffer corresponding to the second thread;  
6 (C) swapping information stored in the first instruction buffer with information  
7 stored in the second instruction buffer.

1 10. (Original) The method of claim 9 wherein step (C) is performed when switching  
2 between the first thread and the second thread is required.

1 11. (Original) The method of claim 9 wherein step (C) is performed when the first  
2 thread stalls.

1 12. (Original) The method of claim 9 wherein step (C) is performed when the second  
2 thread stalls.

1 13. (Original) The method of claim 9 further comprising the step of executing the  
2 second thread after the swapping of information in step (C) by executing at least  
3 one instruction in the first instruction buffer.

1 14. (Original) The method of claim 9 further comprising the steps of:  
2 (D) providing a third instruction buffer corresponding to a third thread;  
3 (E) providing a fourth instruction buffer corresponding to a fourth thread; and  
4 (F) swapping information stored in the third instruction buffer with information  
5 stored in the fourth instruction buffer.

1 15. (Original) The method of claim 14 wherein step (F) is performed when the third  
2 thread stalls.

1 16. (Original) The method of claim 14 wherein step (F) is performed when the fourth  
2 thread stalls.

1 17. (Original) The method of claim 14 wherein the first and third threads  
2 simultaneously issue instructions for execution.

1 18. (Original) A method for switching between first and second threads of execution  
2 in a multithreaded processor, the method comprising the steps of:  
3 (A) providing a first primary instruction buffer corresponding to the first thread;  
4 (B) providing a second primary instruction buffer corresponding to the second  
5 thread;  
6 (C) providing a first backup instruction buffer corresponding to a first backup  
7 thread;  
8 (D) providing a second backup instruction buffer corresponding to a second  
9 backup thread;  
10 (E) simultaneously issuing instructions from the first primary instruction buffer  
11 and from the second primary instruction buffer; and  
12 (F) detecting when one of the first and second primary threads stalls, and in  
13 response thereto, swapping information stored in one of the first and second primary  
14 instruction buffers corresponding to the stalled thread with information stored in one of  
15 the first and second backup instruction buffers.

1 19. (Original) The method of claim 18 wherein step (E) comprises the steps of:  
2 (1) detecting when the first primary thread stalls, and in response thereto,  
3 swapping information stored in the first primary instruction buffer with  
4 information stored in the first backup instruction buffer; and  
5 (2) detecting when the second thread stalls, and in response thereto,  
6 swapping information stored in the second primary instruction buffer with  
7 information stored in the second backup instruction buffer.

1 20. (Original) The method of claim 18 wherein the first and second backup  
2 instruction buffers are part of a pool of backup instruction buffers, wherein  
3 information in any backup instruction buffer in the pool may be swapped with  
4 information in the first primary instruction buffer, and wherein information in any

5            backup instruction buffer in the pool may be swapped with information in the  
6            second primary instruction buffer.

1    21.    (Original) A method for switching between threads of execution in a  
2            multithreaded processor, the method comprising the steps of:  
3            (A) providing a first primary instruction buffer corresponding to the first thread;  
4            (B) providing a second primary instruction buffer corresponding to the second  
5            thread;  
6            (C) providing a first backup instruction buffer corresponding to a first backup  
7            thread;  
8            (D) providing a second backup instruction buffer corresponding to a second  
9            backup thread;  
10            (E) simultaneously issuing instructions from the first primary instruction buffer  
11            and from the second primary instruction buffer; and  
12            (F) detecting when the first thread stalls, and in response thereto, issuing from  
13            the first backup instruction buffer instead of issuing from the first primary instruction  
14            buffer.

1    22.    (Original) The method of claim 21 further comprising the step of  
2            (G) detecting when the second thread stalls, and in response thereto, issuing from  
3            the second backup instruction buffer instead of issuing from the second primary  
4            instruction buffer.

### **STATUS OF THE CLAIMS**

Claims 1-22 were originally filed in this patent application. In the pending office action, claims 1-2 and 9-13 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,348,671 to Doing *et al.* (hereinafter “Doing”). Claims 3-6, 8 and 14-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Doing in view of U.S. Publication No. 2003/0135711 to Shoemaker *et al.* (hereinafter “Shoemaker”). Claims 7 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Doing in view of Shoemaker and U.S. Patent No. 6,314,511 to Levy *et al.* (hereinafter “Levy”). Claims 21 and 22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Doing and Shoemaker in view of U.S. Patent No. 6,957,326 to Redington. Claims 1-20 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2005/0081018 to Luick.. No claim was allowed. No claim has been amended herein. Claims 1-22 as originally filed are currently pending.